

Figure 4.3-11 Pacific Islander Population

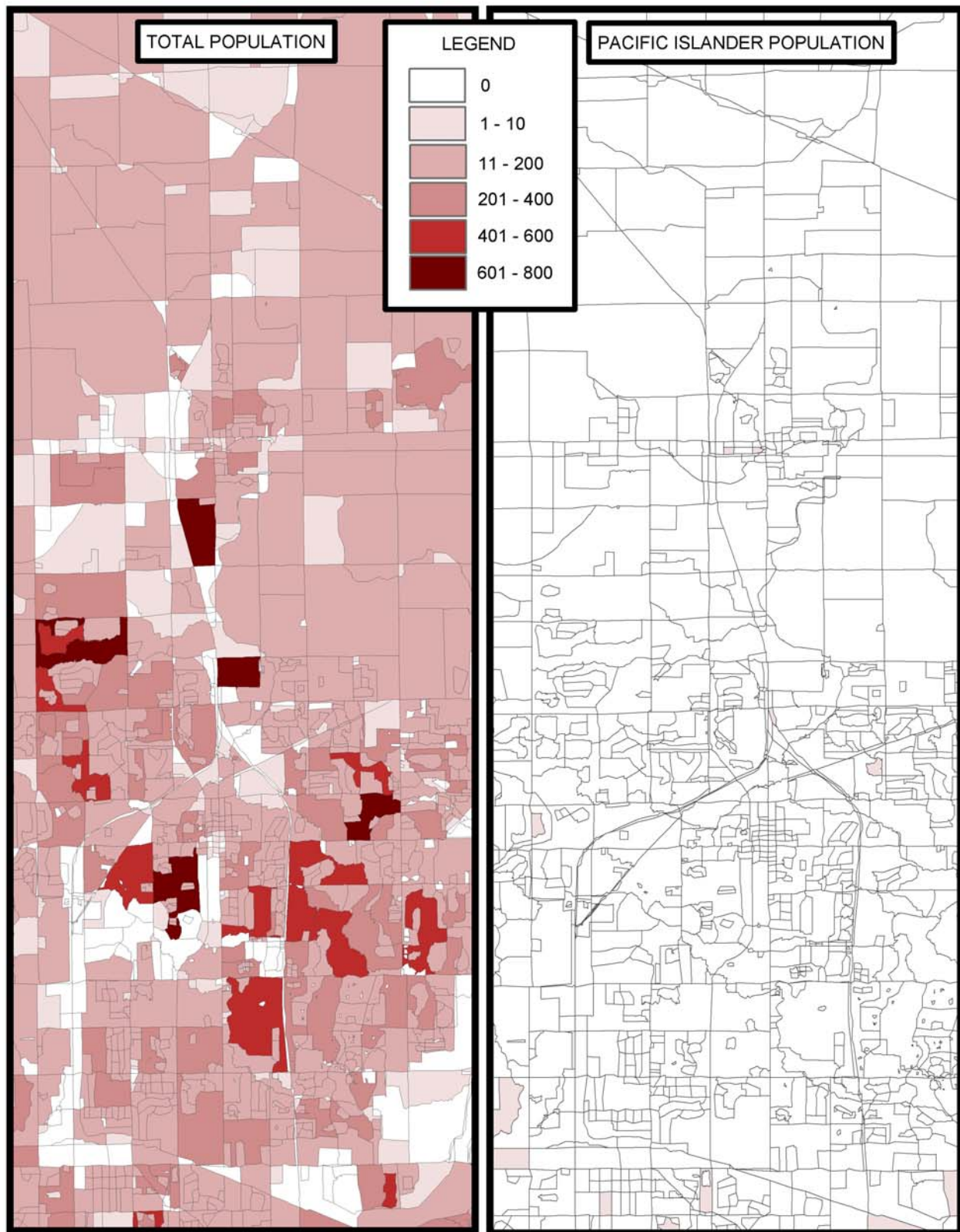
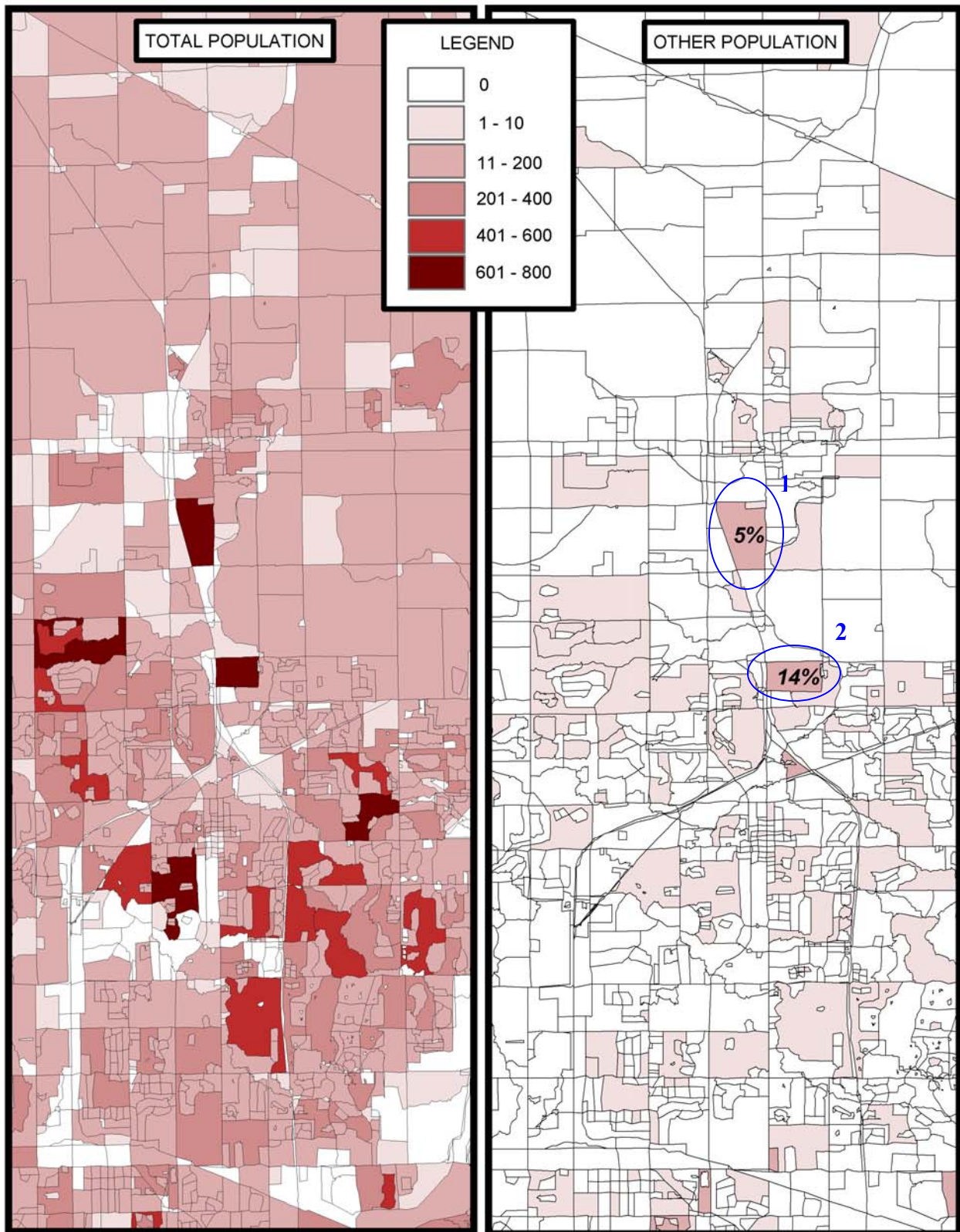
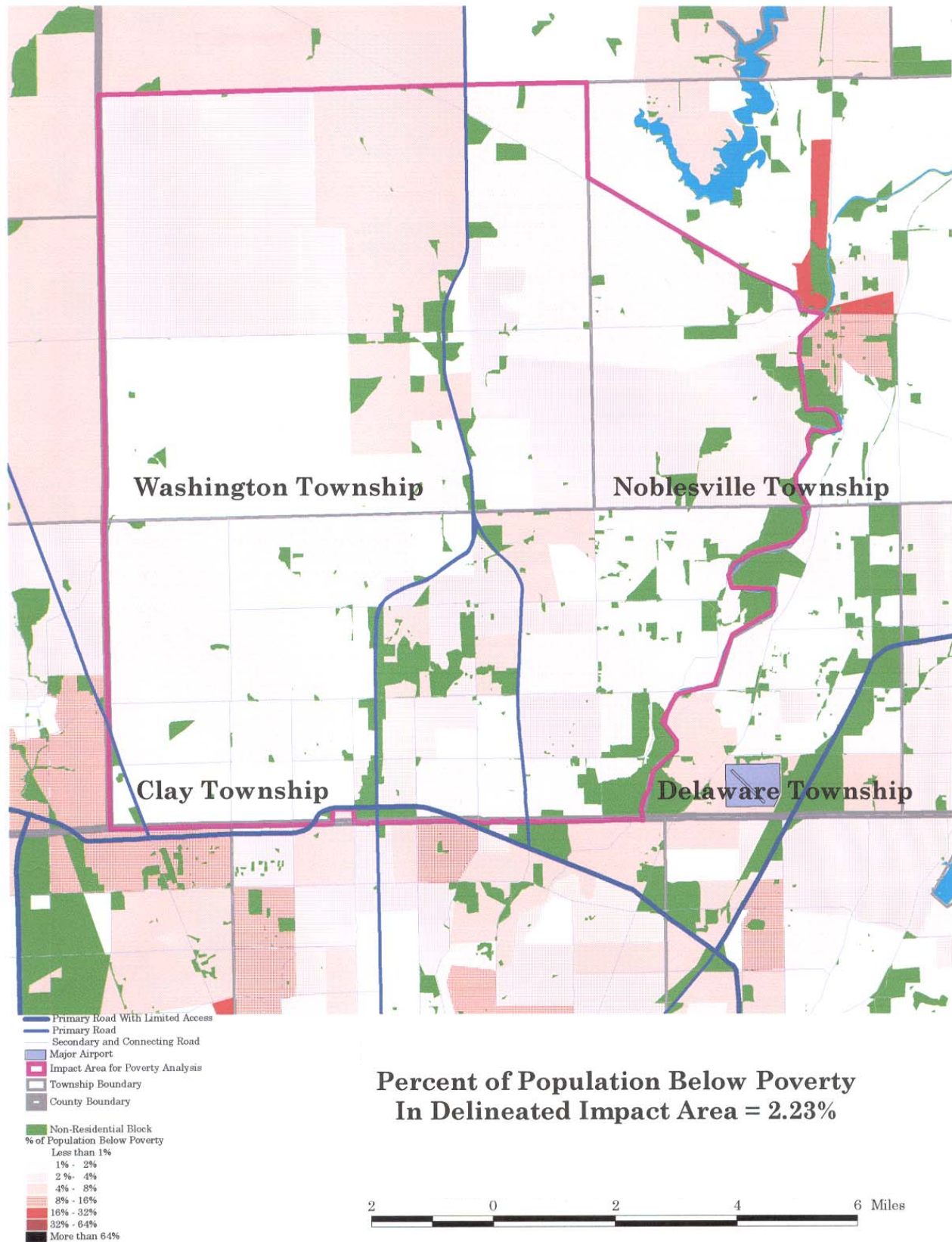


Figure 4.3-12 Other Population (e.g., interracial, multiracial, etc.)



Percent of total population per block. Indicated only when above 1%.

Figure 4.3-13 Population Below Poverty



4.4 Community Facilities and Services

Community Facilities and Services include but are not limited to religious facilities (church, mosque, synagogue, etc.), hospitals, schools, emergency facilities (fire, police, etc.), libraries, day-care centers, cemeteries, and recreational properties (Section 4(f)).

4.4.1 Schools

Within the Carmel/Clay School District, there are no schools located adjacent to the US 31 corridor or within the project area. However, schools within the Carmel/Clay School District utilize the corridor for bussing students. Within this district, there are three elementary schools, a junior high school, and high school. These schools include: Orchard Park Elementary, Carmel Elementary, College Wood Elementary, Carmel Junior High and Carmel High School.

The Westfield Washington School District has six schools located within the project area. These schools include Oak Trace Elementary, Carey Ridge Elementary, Washington Elementary, Westfield Intermediate School (Appendix A, Sheet 9), Westfield Middle School (Appendix A, Sheet 9), and Westfield High School (Appendix A, Sheet 9). Westfield Woods Elementary (Appendix A, Sheets 16 and 17) is under construction at this time and is located off Grassy Branch Road. Four of these schools are located immediately adjacent to the existing US 31 alignment: the Washington Elementary School, Westfield Intermediate School, Westfield Middle School, and Westfield High School, all located in Appendix A on map Sheet 9.

4.4.2 Churches

Churches located within the study corridor include: the Pilgrim Lutheran Church (Appendix A, Sheet 1) on US 31 south of 103rd Street, the Carmel Apostolic Church (Appendix A, Sheets 4A and 4B) located south of 131st Street and west of Old Meridian Street, the Bethlehem Lutheran Church located northwest of the intersection of US 31 and 131st Street (Appendix A, Sheets 4A and 4B), the River Oaks Community Church (Appendix A, Sheets 4A and 4B) located on the northwest corner of the 131st Street/Old Meridian Street intersection, the St. Christopher's Episcopal Church (Appendix A, Sheets 4A and 4B) on 131st Street just east of US 31, the Seventh-Day Adventist Church (Appendix A, Sheet) on US 31 just north of 151st Street (Appendix A, Sheets 1, 4 and 7) and the Trinity Baptist Church (Appendix A, Sheet 10) located south of 191st Street.

4.4.3 Cemeteries

There are several cemeteries located within the project area. In Carmel/Clay Township there is the Carmel Cemetery on Rangeline Road (Appendix A, Sheet 5). In Westfield/Washington Township there is the Indianapolis Hebrew Cemetery (Appendix A, Sheet 7) on 161st Street, the Chester Friends Cemetery (Appendix A, Sheets 10 and 11) on 196th Street, Pleasant View Cemetery (Appendix A, Sheets 12 and 19) on E 202nd Street, the Summit Lawn Cemetery (Appendix A, Sheet 15) on Westfield Boulevard and the Hamilton Memorial Park Cemetery (Appendix A, Sheet 16) on SR 32. The following cemeteries are located immediately adjacent to the existing US 31 alignment: the Carmel Cemetery (Appendix A, Sheets 5, 6A, 6B and 6C) and the Chester Friends Cemetery (Appendix A, Sheets 10 and 11). Additionally, there are two cemeteries immediately adjacent to the proposed off-alignment route: the Summit Lawn

Cemetery (Appendix A, Sheet 15) and the Hamilton Memorial Park Cemetery (Appendix A, Sheet 16).

4.4.4 Libraries

Carmel/Clay Township has one public library located outside of the project area at the corner of 4th Ave SE and Main Street in Carmel. Westfield/Washington Township has one library, which is located on West Hoover Street about 0.25 miles east of US 31 (Appendix A, Sheet 9).

4.4.5 Fire Stations, Police Stations, and Emergency Medical Services (EMS)

Carmel/Clay Township has five fire stations located throughout the City of Carmel and Clay Township providing fire protection, Emergency Medical Services (EMS), training and other services. None of these fire stations are located within the project area. The fire station headquarters is located at 2 Civic Square in Carmel. There is one police station serving Carmel/Clay Township, located at 3 Civic Square in Carmel.

Westfield/Washington Township has two active fire stations providing fire protection and EMS. Station 81 (Public Safety Headquarters Building) located at SR 32 and Dartown Road and Station 82, located at US 31 and 151st Street (Appendix A, Sheets 6 and 7).

Westfield/Washington Township has one police station, which is also located in the Public Safety Headquarters Building at SR 32 and Dartown Road in Westfield. Both the fire and police stations located on SR 32 and Dartown are located outside of the study area.

None of the Fire Stations, Police Stations or EMS facilities within the project area has direct access to the existing US 31 corridor. The closest facility would be Fire Station #82 (Appendix A, Sheets 6, 7 and 14) which accesses 31 via 151st Street.

4.4.6 Hospitals

St. Vincent Carmel Hospital (Appendix A, Sheets 4 and 5) is the only general hospital located within the project area. Riverview Hospital is located on SR 32 approximately 5 miles east of Westfield in Noblesville. However, there are several other types of medical facilities within the corridors; The Heart Center of Indiana (Appendix A, Sheet 2) just south of 106th Street, Methodist Sports Medicine Center (Appendix A, Sheet 1) on Pennsylvania Parkway, MedCheck Immediate Care facility (Appendix A, Sheet 3) on North Pennsylvania Street, as well as several surgical centers.

4.4.7 Public Parks and Recreation Areas

Carmel/Clay Parks and Recreation areas within the project area include: Pleasant Grove Park located east of the US 31 corridor (Appendix A, Sheet 2); the Monon Greenway that crosses under US 31 north of 136th Street (Appendix A, Sheet 5) and the Meadowlark Park that has a trail system ending near the intersection of Old Meridian Street and Guilford Road (Table 4.4-1) (Appendix A, Sheet 5).

Westfield/Washington Parks and Recreation areas within the project area include: All of the sports facilities and play grounds associated with the Washington/Westfield Schools (Appendix

A, Sheet 9) located east of US 31 and north of US 32 and the Asa Bales Park (Appendix A, Sheet 9) located south of 181st Street and east of the Westfield Middle School. Two planned and proposed parks and recreation areas are also located within the project area: The proposed South Union Trail (Appendix A, Sheet 7, 14 and 15) located along South Union Street (Westfield Boulevard) north of 156th Street and the planned MacGregor Park (Appendix A, Sheets 12, 13 and 20) located northeast of the intersection of US 31 and US 38.

There is one park included in the Hamilton County Parks and Recreation areas located within the project area: The Cool Creek Park (Appendix A, Sheets 6A, 6B, 6C, 7 and 14), located in Washington Township north of 151st Street.

**Table 4.4-1
Area Public Parks and Recreation Areas**

Park District	Name of Park	Location
Carmel Clay Parks and Recreation	- Pleasant Grove Park	South of 111 th Street/East of US 31
	- Monon Greenway	North of 136 th Street at US 31
	- Meadowlark Park & Trail	450 Meadow Lane
Town of Westfield Parks Washington Township Parks	-Westfield/Washington Township School Sports Facilities	East of US 31 and north of US 32
	-Asa Bales Park	South of 181 st Street and east of the Westfield Middle School
	- South Union Street Trail Park (proposed)	SR 32 to East 161 st Street
	- MacGregor Park (planned)	US 31 at SR 38
Hamilton County Parks and Recreation	- Cool Creek Park and Nature Center	2000 East 151 st Street (post office)

4.4.8 Utilities

The majority of the project area is currently serviced by public water and sewerage. There are four public wells within the project area (Appendix A, Sheets 7 and 9). The USEPA and IDEM regulate wellhead protection zones around public wells. In Westfield/Washington Township there are some properties that use wells and septic tanks. There are a few large diameter gas main lines crossing existing US 31 just south of 156th Street (Appendix A, Sheet 7). These lines belong to CMS Energy - Panhandle Eastern Pipe Line and consist of four, high pressure, natural gas lines that are from 24" to 36" in diameter. Additionally there are smaller diameter pipelines containing natural gas and crude oil crossing through the project corridor at various locations (Appendix A, Sheets 2 to 19). There are also a series of high power electrical lines run along SR 38 (Appendix A, Sheets 12 and 20).

4.5 Farmland

Historically, agriculture has played a central role in the economy of Hamilton County. Like most Indiana counties, Hamilton County has relied upon soybeans, corn, winter wheat, and hay to sustain its rural economy. More recently, urban development (residential and commercial) has been extensive throughout the southern half of the county. Figure 4.5-1 illustrates the historic decline of farmland use from 1900 to 1997.

According to the Indiana Agricultural Statistics Service, in 1997 farmland in Hamilton County encompassed 140,813 acres on 591 farms and was ranked third in the state with an average value per acre for land and buildings of \$3,478. In 1998, this land accounted for just 4.1% of the assessed land value in the county at \$9.31 million. Cash receipts for the county ranked 44th of Indiana's 92 counties in 1999. Commodities raised in Hamilton County in 2000 were typical of the state and included corn, soybeans, winter wheat, cattle and hay. With a yield of 87 bushels/acre, the county also ranked second in the state for yield of winter wheat.

Historic aerial photography reveals that the majority of the growth within Hamilton County was concentrated around the City of Noblesville from the 1940s until the mid 1970s to early 1980s. More recently, growth has been occurring along the US 31 corridor in association with the City of Carmel and the Town of Westfield. Additional growth was observed in association with the Town of Fishers.

In the 1940s until the 1970s most of the US 31 corridor was agricultural land. According to 1941 aerial photography, the US 31 corridor was predominantly wooded and agricultural. In 1962, the agricultural land south of 116th Street and east of US 31 demonstrated signs of growth. Additionally in 1962, the areas east of the intersection of US 31 and SR 32 were experiencing both residential and commercial growth. By 1974, the area north of I-465 and east of US 31 was growing rapidly. From 1974 to 1998, the growth continued along the US 31 corridor moving from a once predominantly agricultural nature towards a more commercial and industrial corridor.

The proposed off-alignment corridor has remained agricultural in nature with very few developments over the past 60 years. Only within the past 15 years have neighborhoods began to develop east of the Town of Westfield. Perhaps the largest developments, Oak Manor and Oak Manor PUD, are currently under construction or proposed for construction east of Oak Road between 161st Street and SR 32. The off-alignment route north of SR 32 remains primarily agricultural today, however much of the land is zoned residential (Figure 4.3-4).

Prime farmland soils are prominent throughout the project area. As defined by the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), prime farmland is "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops, and is also available for these uses (i.e., land that could be cropland, pastureland, rangeland, forest land or other land, but not urban built-up land or water)." These soils must also be protected from flooding and not be susceptible to ponding for long periods of time in order to be considered prime farmland. Soils in the following series are located in the project area and are considered prime farmland soils: Fox, Miami, Milton, Nineveh, Ockley, Ross and Genessee. These soils have the "quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods." Agricultural land and prime farmland soils within the project area are shown in Appendix A, Sheets 1-20.

Figures 4.3-2 and 4.3-3 illustrate the percentage of agricultural land in Clay Township and Washington Township, respectively.

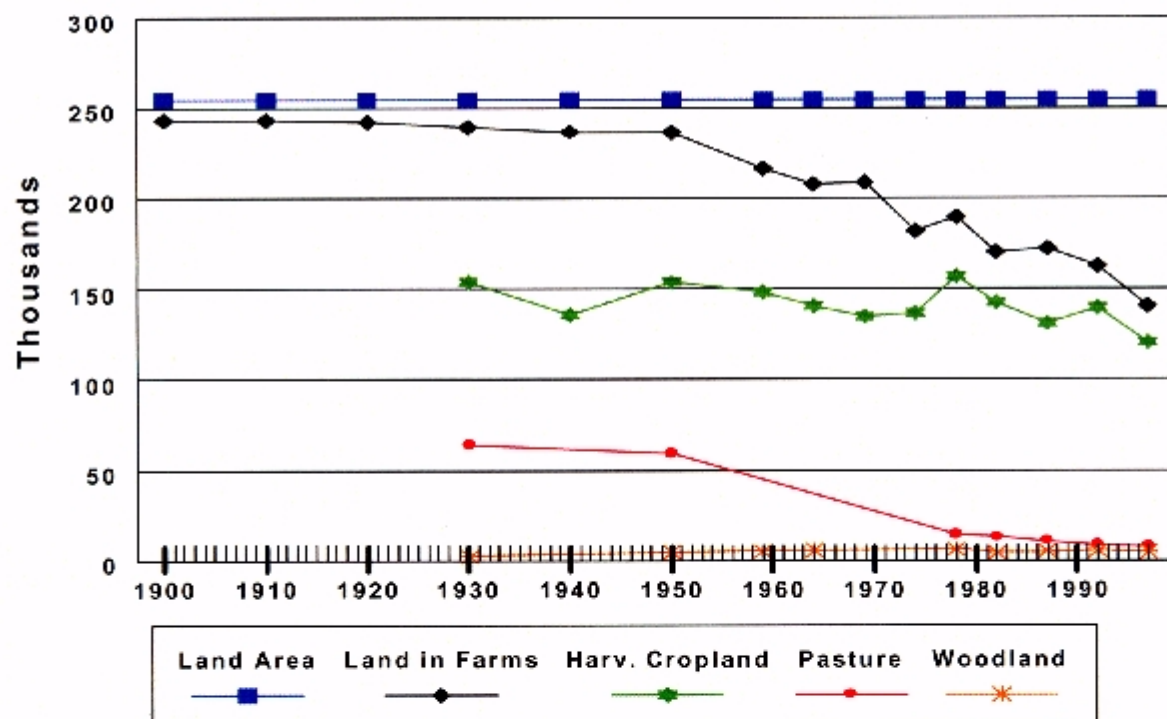
INDIANA FARM LAND USE HISTORY

Hamilton County, Indiana



Total Land Area 1997 - 254,731 Acres

Year	Land in Farms	Harvested Cropland	Land Pastured	Woodland Not Pastured
----- Acres -----				
1900	243,105	n/a	n/a	n/a
1910	243,379	n/a	n/a	n/a
1920	242,165	n/a	n/a	n/a
1930	239,756	153,857	63,947	2,270
1940	237,119	135,630	n/a	n/a
1950	236,968	153,759	59,196	4,627
1959	216,917	148,291	n/a	5,249
1964	208,062	140,482	n/a	5,517
1969	209,132	134,819	n/a	n/a
1974	182,265	137,283	n/a	n/a
1978	189,804	156,756	14,023	6,155
1982	170,311	142,497	12,920	4,076
1987	172,157	130,975	10,395	4,854
1992	162,670	139,593	8,503	5,130
1997	140,813	120,531	7,608	4,537



Source: U.S. Census of Agriculture
Assembled February 1999

Indiana Agricultural Statistics Service
<http://www.nass.usda.gov/in/>



FIGURE 4.5-1
Indiana Farm Land Use History
Hamilton County Agricultural Census
Draft Environmental Impact Statement
Hamilton County, Indiana

4.6 Historic and Archaeological Resources

Section 106 of the National Historic Preservation Act (NHPA) requires Federal Agencies to take into account the effects of their undertakings on historic properties and afford reasonable opportunity for interested persons to comment on the proposed actions. Regulations by which a federal agency meets its obligations under Section 106 are found in 36CFR Part 800.

Historic resources which met one of the criteria for listing on the National Register of Historic Places *and* which retained adequate integrity to convey such associations were determined “Eligible” in consultation with the IDNR, Division of Historic Preservation and Archaeology (State Historic Preservation Officer [SHPO]). No right-of-way, temporary or permanent, will be used from any area within the boundaries of historic resources.

National Register Criteria

(From Bulletin 16A, U. S. Department of the Interior, National Park Service)

Criteria: The quality of significance in American history, architecture, archeology, engineering and culture is present in districts, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
- B. That are associated with the lives of persons significant in our past; or,
- C. That embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. That yielded, or may be likely to yield, information important in prehistory or history.

Criteria Considerations

The following are ordinarily not considered eligible for the National Register:

- Cemeteries;
- Birthplaces, or graves of historical figures;
- Properties owned by religious institutions or used for religious purposes;
- Structures that have been moved from their original locations;
- Reconstructed historic buildings;
- Properties primarily commemorative in nature; and
- Properties that have achieved significance within the past 50 years.

However, such properties will qualify if they are integral parts of districts that meet the criteria or fall within the following categories:

- A. A religious property deriving primary significance from architectural or artistic distinction or historical importance; or

- B. A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- C. A birthplace or grave of a historical figure of outstanding importance if there is no other appropriate site or building directly associated with his or her productive life; or
- D. A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or
- E. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or
- F. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own historical significance; or
- G. A property achieving significance within the past 50 years if it is of exception importance.

This study has been prepared in compliance with requirements for transportation projects in accordance with State and Federal statutory and regulatory provisions, including the following:

- The National Preservation Act, its Amendments and related orders, including the Advisory Council Procedure for the Protection of Historic and Cultural Properties (36 CFR part 800) and recent amendments;
- The National Register Criteria and Guidelines for Recovery of Scientific, Prehistoric, Historic, and Archeological Data including methods, Standards and Reporting Requirements (36 CFR part 1200);
- Archeological and Historic Preservation Acts of 1974 and 1979;
- National Park Service and Reservoir Salvage Act of 1960 as amended in 1974;
- FHWA-IN Section 106 Consultation Procedures;
- U. S. Department of Transportation Administrative Act of 1966 and relevant regulations; and
- Federal Aid to Highway Act of 1968.

Criteria of Adverse Effects (36 CFR Part 800)

An adverse effect is found when an undertaking may alter, directly or indirectly any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effect may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

Adverse effects on historic properties include, but are not limited to:

- Physical destruction of or damage to all or part of the property;
- Alteration of a property... that is not consistent with the Secretary's Standards (36 CFR part 68).
- Removal of the property from its historic location

- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;
- Neglect of a property which causes its deterioration (with some exceptions)

Methodology

Direct Physical Impact

Direct physical impacts include any encroachment on the National Register boundary of a given historic resource that would involve the acquisition of any or all of the property. This relates to Criteria 1, but changes to access of the property may also relate to Criteria 4.

Visual Effects

36 CFR 800 does not specify a methodology for the assessment of potential visual effects. In the absence of specific guidelines, a variety of tools were used. A visibility analysis was conducted for each National Register eligible resource within the area of potential effects (APE), with the proposed right-of-way, construction limits, and APE (1,500 feet from center line in either direction of the alignment) marked. Visual effects relate to Criteria 5) but may also relate to Criteria 4), especially where the viewshed is a part of the property's setting.

Auditory Impact

36 CFR 800 does not specify a methodology for the assessment of potential auditory impacts. In the absence of specific guidelines, INDOT's Noise Policy criteria for the consideration of highway traffic noise on Federal-aid highway projects was applied. This policy considers sound levels greater than or equal to 66 dBA and/or an increase in projected noise levels of 15 dBA or more an adverse effect.

4.6.1 Historic Resources

A field reconnaissance and preliminary determination of eligibility for historic resources that were located within the Area of Potential Effects (APE) was conducted. This study identified two individual properties and one historic district (Figure 4.6-1) that may be potentially eligible for inclusion in the National Register of Historic Places (NRHP).

- Westfield Historic District (considered eligible)
- Hunt House (considered eligible)
- Lindley Farm (considered eligible)

In a letters dated May 15, 2002; February 17, 2003; and March 28, 2003, the Indiana SHPO has stated that the Hunt House and the Lindley Farm are individually eligible for inclusion in the NRHP due to their architectural significance. Additionally in the March 28, 2003 letter, the SHPO agreed that the Westfield Historic District is eligible for inclusion in the NRHP for its collection of late 19th Century architecture. Copies of the above referenced letters are located in Appendix E, Section 106 Correspondence.

The Westfield Historic District is located near the intersection of Union Street and Main Street downtown Westfield. The district is made up of eleven properties located on the northeast, northwest and southwest corners of the intersection. There are several building including an excellent brick and limestone bank block and Carnegie Library, which could potentially form the nucleus of the potential historic district. Figures 4.6-2 and 4.6-3 are representative photographs of the district.



Figure 4.6-2 NE Corner of Union and Main Streets



Figure 4.6-3 NW Corner of Union and Main Streets

The T.J. Lindley Farm, located at 20820 US 31 North, includes an Italianate home (c. 1886) (Figure 4.6-4), a large stone foundation, board and batten sided barn (c. 1870) (Figure 4.6-5) and associated outbuildings. In addition, the pasture area connected with this barn appears to have been unaltered since its earliest time. The house is an outstanding example of the late Italianate style, with excellent workmanship and materials (Appendix A, Sheets 12, 13, 19 and 20).

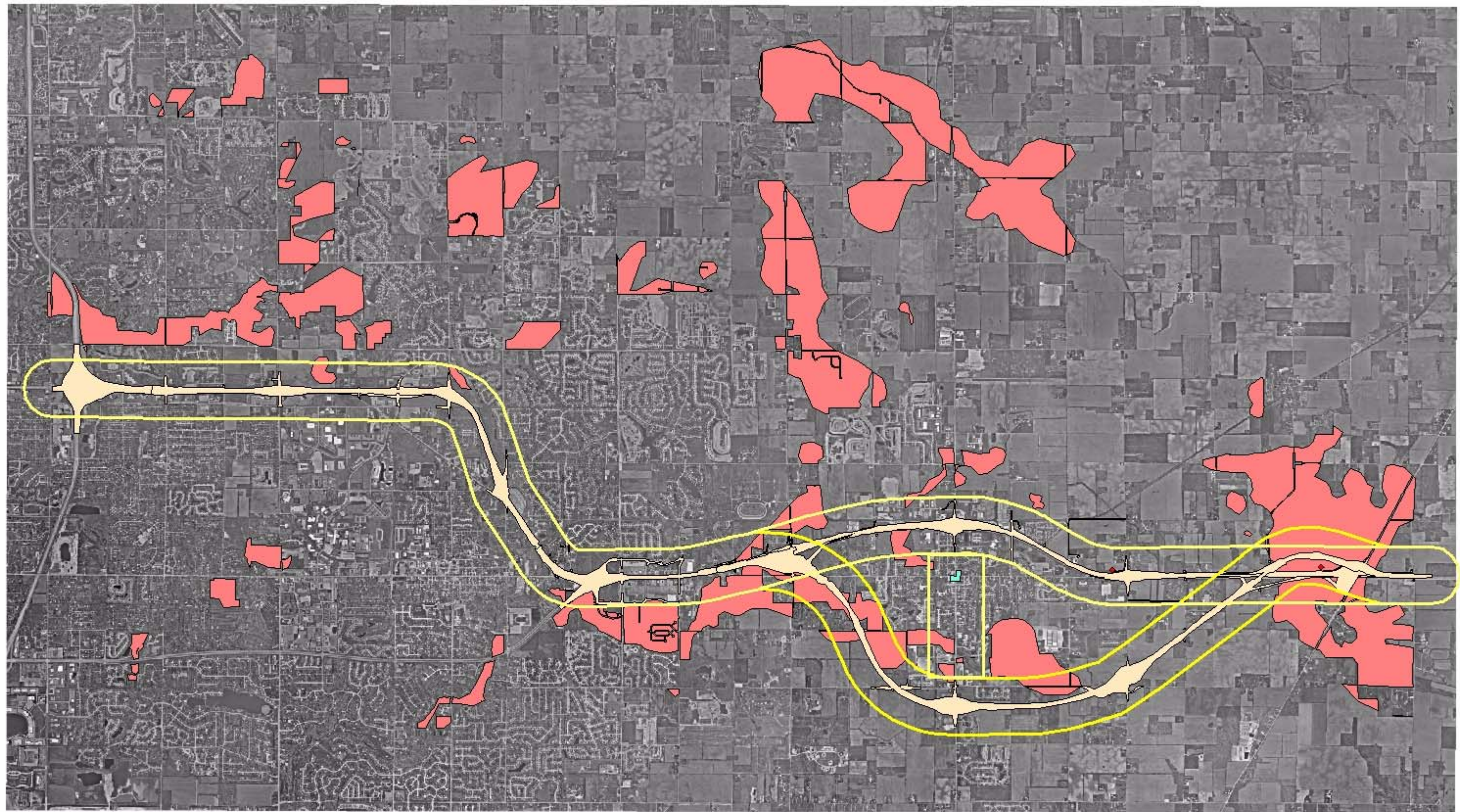


Figure 4.6-4 Lindley Farm House



Figure 4.6-5 Lindley Farm Barn

The Hunt House (Figures 4.6-6 and 4.6-7), located on US 31 north of Westfield, is a Gothic Revival house (c. 1870). This house is one of few high style gothic revival residences within Hamilton County. While a great deal of overgrowth has occurred, it retains its integrity, and is potentially eligible for the National Register (Appendix A, Sheets 10 and 11).



● Individual Historic Properties
(Potentially Eligible)

□ Area of Potential Effect (APE)

□ Westfield Historic District
(Potentially Eligible)

■ High Probability Archaeological Areas



Locations of archaeological sites are not indicated at the request of SHPO

FIGURE 4.6-1
Historic Property Locations
High Probability Archaeological Areas
 Draft Environmental Impact Statement
 Hamilton County, Indiana



Figure 4.6-6 Hunt House



Figure 4.6-7 South side of Hunt House

4.6.2 Archaeological Resources

The archaeological resources were investigated within the project area to determine if there were any sites listed on or eligible for the National Register of Historic Places (NHRP).

A literature study was conducted to locate archaeological resources in the project area. This study consisted of examining cultural resource management reports (CRM), archaeological site forms and archaeological and architectural site location maps at the IDNR Division of Historic Preservation and Archaeology (DHPA).

This review revealed that numerous professional surveys of the project area have been conducted. Ball State University, Indiana State University, and various professional environmental consulting firms have, over the past 20 years, evaluated the potential impacts posed by commercial and housing development throughout this portion of Hamilton County. Through the literature search, 42 sites previously surveyed were identified within and adjacent to the project area. These sites include 16 prehistoric lithic scatters, 14 prehistoric isolated fields, 4 prehistoric camps, 3 historic artifact scatters, 1 farmstead, 2 multi-component farmsteads with prehistoric lithic scatters, and 2 multi-component historic and prehistoric lithic scatters. Seven of these sites were recommended as eligible or potentially eligible for inclusion on the National Register of Historic Places (NRHP) and would require additional surveying if potentially impacted by the project. None of the sites identified as potentially eligible for inclusion in the NRHP are located along the existing or proposed corridor. Additionally none of the identified sites warrant preservation in place.

In addition to the sites that have been previously located, specific soils and land formations also provide the potential for site discoveries. Soils with the highest probability of producing cultural remains are associated with geographic formations such as terraces and floodplains. Floodplain associated soils tend to have a high probability to produce cultural materials, but they would also require deep testing as these materials could be buried. Soils with a moderate probability of producing cultural materials are associated with till plains and make up the majority of the project area. Soils with the lowest probability of producing cultural materials are associated with glacial sluiceways.

In order to preserve the integrity of the archaeological resources, the Indiana SHPO has requested that locations of archaeological resources not be disclosed. However, Figure 4.6-1 illustrates high probability areas, which are areas that have a high probability of containing archaeological resources based upon soil type and location.

4.7 Air Quality

This section summarizes existing air quality conditions in the project area.

4.7.1 Regulatory Setting

Under the authority of the Clean Air Act (CAA) and the 1990 Clean Air Act Amendments (CAAA) [42 U.S. Code (USC) 7401 *et seq.*], a set of primary and secondary Ambient Air Quality standards for six criteria pollutants was established. The primary standards are intended to protect the public health. Secondary standards are intended to protect public welfare and are based on a pollutant's effect on vegetation and other materials. The primary standards for each of the six pollutants are shown in Table 4.7-1. Except for sulfur dioxide and carbon monoxide, the secondary standards are the same as the primary standards for all pollutants. Indiana's Ambient Air Quality Standards are identical to the Federal standards shown in Table 4.7-1.

Table 4.7-1
Summary of National and Indiana Primary Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard
Particulate Matter, 10 micrometers (PM ₁₀)	Annual Arithmetic Mean 24-hour	50 µg/m ³ 150 µg/m ³
Particulate Matter, (PM _{2.5})	Annual Arithmetic Mean 24-hour	15 µg/m ³ 65 µg/m ³
Sulfur Dioxide (SO ₂)	Annual Arithmetic Mean 24-hour	0.03 ppm (80 µg/m ³) 0.14 ppm (365 µg/m ³)
Carbon Monoxide (CO)	8-hour 1-hour	9.0 ppm (10 mg/m ³) 35.0 ppm (40 mg/m ³)
Ozone (O ₃)	1-hour/day 8-hour/day	0.12 ppm (235 µg/m ³) 0.08 ppm (157 µg/m ³)
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	0.053 ppm (100 µg/m ³)
Lead (Pb)	Maximum Quarterly Average	1.5 µg/m ³

Source: U.S. EPA

Generally, when levels of pollutants do not exceed the annual average standards and do not exceed the short-term (1-, 8-, and 24-hour) standards more than once per year, an area is considered in attainment of the National Ambient Air Quality Standards [NAAQS (CAA 1990, Part A, Section 109)].

Hamilton County is the area designated as an air quality region and is in attainment for all pollutants. Since the entire project area is in Hamilton County, no portion of this project is within a designated non-attainment area for any of the air pollutants for which the U.S. EPA has established standards. Air quality monitoring data for the project area was obtained from the Indiana Department of Environmental Management (IDEM), Office of Air Quality. The only monitoring site in Hamilton County is an ozone (O₃) monitoring site located in the Town of Noblesville. At this site, there has been one violation of the one-hour NAAQS for ozone (0.12 ppm) since 1998. The highest recorded concentration in 2002 was 0.121 ppm.

4.7.2 Existing Ambient Air Quality

Microscale Carbon Monoxide Analysis. Since it is a site-specific pollutant with its major concentrations generally found immediately adjacent to roadways, Carbon Monoxide (CO) is usually of concern on a local or microscale basis. Therefore, the study of air quality impacts as a result of project-generated traffic is typically evaluated through a microscale analysis of traffic-related CO levels. The microscale air quality analysis for this study evaluated local CO levels at receptor sites located in the vicinity of the proposed interchanges at 116th and 146th Streets.

Microscale CO concentrations are estimated through the use of computerized mathematical models (MOBILE5B and CAL3QHC) since data on street level CO concentrations is not available for most projects. Using the models, worst case CO levels were calculated for the peak one-hour and eight-hour time periods, corresponding to the averaging periods of the federal and state ambient CO standards. Default background CO concentrations of 3.0 and 1.5 ppm were used for the one-hour and eight-hour analyses, respectively. For future year analyses, (in Section 5.4) no rollback was used to adjust the background concentrations.

Maximum existing one-hour CO concentrations were estimated to range from 3.6 ppm to 6.4 ppm for the receptors analyzed. The estimated eight-hour concentrations range from 1.9 ppm to 3.9 ppm. These estimated concentrations are below the NAAQS one-hour and eight-hour standards of 35.0 and 9.0 ppm. The highest existing CO concentrations are estimated at the 116th Street intersection.

4.8 Noise

This section summarizes the noise analyses performed for the existing conditions in the US 31 project area.

4.8.1 Regulations

The unit of measurement used in sound measurement is the decibel (dB), and the unit of measurement used for traffic noise is the dB on the A-weighted scale (dBA). The A-weighted scale most closely represents the response of the human ear to sound. The measurement most commonly used to express dBA levels for traffic noise is the Hourly Equivalent Sound Level [L_{eq}(h)]. The L_{eq}(h) describes a noise-sensitive receiver's cumulative exposure from all noise-producing events over a 1-hour period.

Traffic noise studies for road projects in Indiana are performed in accordance with 23 Code of Federal Regulations 772 and INDOT's *Highway Traffic Noise Policy* (October 15, 1997). There

are five main steps comprising traffic noise studies. These are: (1) identify noise sensitive receivers, (2) determine existing ambient peak noise levels, (3) predict future peak noise levels, (4) identify traffic noise impacts, and (5) evaluate mitigation measures for sensitive receivers where traffic noise impacts occur.

4.8.2 Noise Assessment Guidelines

Traffic-generated Hourly Equivalent Noise Levels [$L_{eq}(h)$] were predicted for the base year (2000) and the design year (2025) using STAMINA 2.0, a computer simulation model based on the FHWA Highway Traffic Noise Prediction Model (Report No. FHWA-RD-77-108). This computer model takes into account anticipated traffic volumes, vehicle types, vehicle speeds, roadway geometry, screening provided by buildings, terrain features, and sensitive receiver locations to calculate future traffic-generated noise levels. Noise levels were predicted for the outdoor living areas at each sensitive receiver using the worst traffic conditions likely to occur on a regular basis during the design year. Future traffic-generated noise levels were predicted for Alternatives F1 through F6, Alternatives G1 through G6 and the No-Action Alternative.

According to FHWA and INDOT noise policies, a traffic noise impact occurs when either of the following conditions results at a sensitive receiver:

- The future predicted $L_{eq}(h)$ noise level approaches (is within 1 decibel on the A-weighted scale [dBA]) or exceeds the Noise Abatement Criteria (NAC) shown in Table 4.8-1.
- The future predicted $L_{eq}(h)$ noise level substantially exceeds (by 15 or more dBA) the existing $L_{eq}(h)$ noise level. Traffic-generated noise level increases of 15 dBA or more are typically associated with roadway improvements on a new alignment.

Table 4.8-1
Federal Highway Administration (FHWA) Noise Abatement Criteria (NAC)

Activity Category	$L_{eq}(h)$	Description of Activity Category
A	57 dBA (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 dBA (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, schools, churches, libraries, and hospitals.
C	72 dBA (exterior)	Developed lands, properties, or activities not included in Activity Categories A or B.
D	No limit	Undeveloped lands.
E	52 dBA (interior)	Residences, hotels, motels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums. (The interior criterion only applies when there are no exterior activities to be affected by traffic noise.)

Source: 23 Code of Federal Regulations 772

A total of 232 receptor sites in the project area were identified using field surveys and aerial photographs. All of the receptors identified fall under FHWA activity category B, which includes residences, schools, churches, and hospitals. The noise impact criterion for category B land uses is 67 dBA for exterior activity. A noise impact occurs when this level is approached or exceeded. A noise level within one decibel of a criterion is considered to “approach” the criterion. Therefore, a noise impact is identified where the noise level is equal to or greater than 66 dBA. Structures that would be displaced by the build alternatives were not assessed for potential noise impacts.

4.8.3 Estimated Existing Noise Levels

The existing estimated noise levels for Alternatives F1 through F6 at receptors analyzed in the project area range from 56 dBA to 73 dBA during the peak hour. Noise measurements were also taken near the proposed Alternatives G1 through G6 to estimate the existing noise level in this area. Based on these measurements, the existing noise level near Alternatives G1 through G6 is 52 dBA. Under existing conditions, the noise abatement criterion is exceeded at 51 of the 232 receptors analyzed (Table 4.8-2). All of these 51 receptors are located along the existing US 31 corridor.

**Table 4.8-2
Existing Noise Levels**

Receiver	Noise Level (dBA)	Receiver	Noise Level (dBA)	Receiver	Noise Level (dBA)	Receiver	Noise Level (dBA)
RN100	67.6	RS110	68.7	RS205	69.4	RS510	70.6
RN115	66.3	RS120	69.5	RS210	70.8	RS515	69.6
RN140	69.1	RS125	68.3	RS255	69.3	RS520	69.5
RN145	68.0	RS130	68.2	RS260	66.3	RS525	69.4
RN175	67.2	RS135	68.3	RS275	70.2	RS530	69.3
RN210	66.7	RS165	67.1	RS280	69.7	RS535	69.6
RN240	66.0	RS170	67.1	RS285	69.0	RS540	69.7
RN315	68.1	RS175	68.0	RS290	67.1	RS545	69.7
RN325	67.0	RS180	68.9	RS305	69.9	RS550	69.6
RN335	69.4	RS185	69.5	RS310	67.7	RS555	69.7
RN337	72.5	RS190	69.6	RS315	67.6	RS560	69.8
RN345	68.5	RS195	69.8	RS320	67.3	RS565	70.1
RN360	69.8	RS200	69.5	RS335	67.6		

The noise abatement criterion for commercial sites, category “C” land uses, is 72 dBA. Typically, commercial sites do not want noise mitigation because of the commercial nature of these facilities and the associated benefits from being located along US 31. It is assumed that commercial properties would prefer to maintain their visibility, therefore, no category “C” receptors were analyzed and no noise mitigation is proposed at any commercial property.

4.9 Natural Resources

4.9.1 Soils and Geology

Soil characteristics can affect roadway design and construction: drainage, permeability, depth to water table, depth to bedrock, compaction, shear strength and shrink-swell potential. Soil associations identified within the project area are as follows (Figure 4.9-1):

- **Crosby-Brookston:** Deep, nearly level, somewhat poorly drained and very poorly drained, medium texture and moderately fine textured soils that formed in a fine mantle of loess and the underlying glacial till on uplands.
- **Miami-Crosby:** Deep, nearly level to strong sloping, well drained and somewhat poorly drained, medium texture soils that formed in a thin mantle of loess and the underlying glacial till on uplands.
- **Shoals-Genesee:** Deep, nearly level, somewhat poorly drained, medium textured soils that formed in alluvium on floodplains.

Additional soils information is located in Section 4.5 - Farmland.

Elevations within the project area range from 800 to 900 feet mean sea level. The project area for both alternatives lies within the Tipton till plain. The Tipton till plain is a mixture of various deposits from the Huron-Erie ice lobe. The thickness of glacial deposits range from approximately 50 to 150 feet. The bedrock underlying the project area consists of limestone and dolomite of Silurian and Devonian age (Roadside Geology of Indiana).

In response to the early coordination packet, the NRCS made comments regarding the potential for erosion and sedimentation resulting from construction or earth moving activities at or nearby the project area. Additionally they noted many of the soils located within the project corridor are prone to flooding.

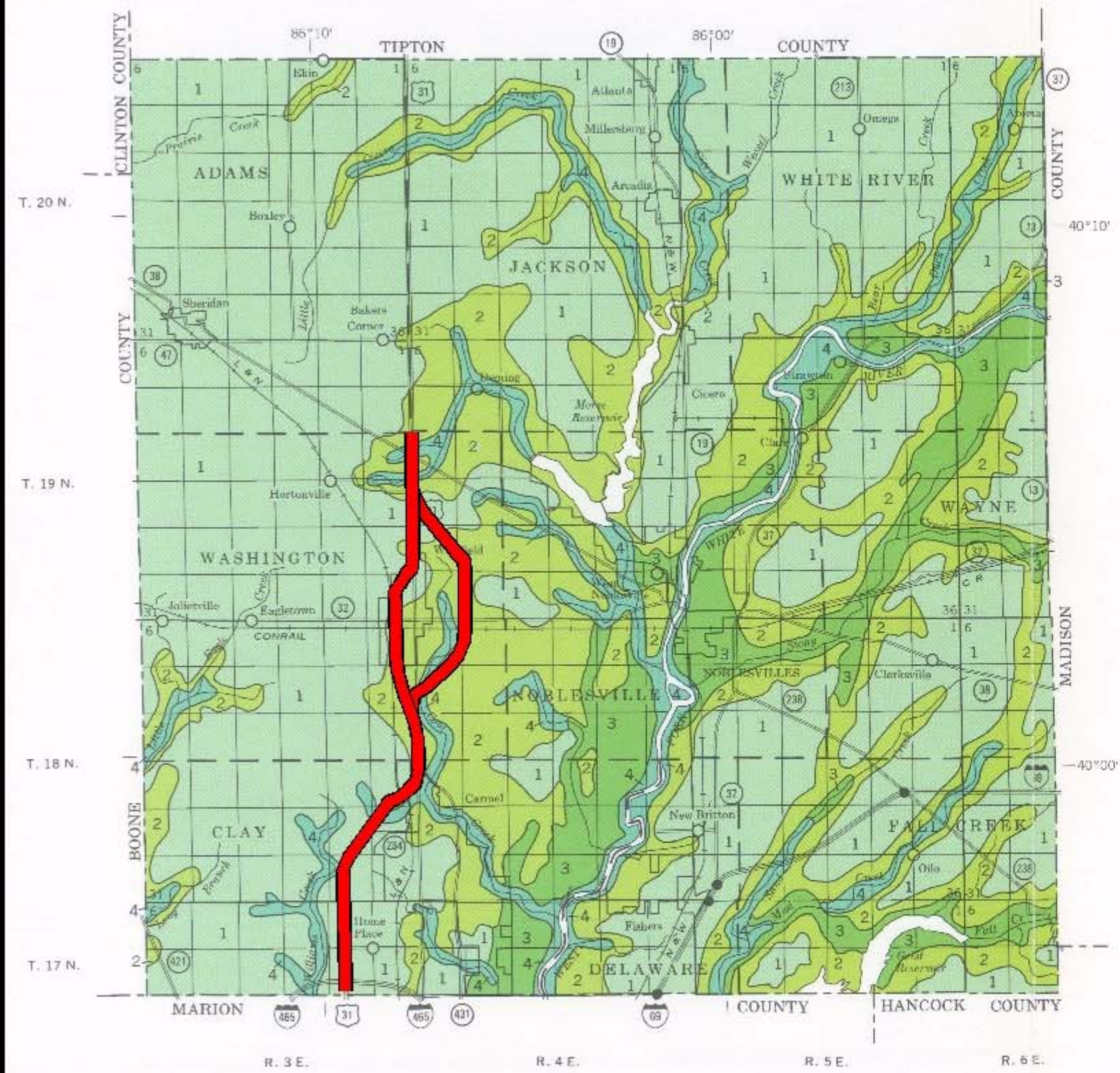
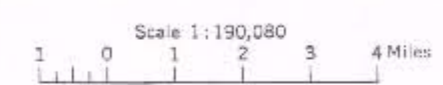
4.9.2 Terrestrial Wildlife and Habitat

Terrestrial habitats occurring within the project area include forested riparian corridors (streambanks)/floodplains, upland forests, agricultural/pastureland, herbaceous rangeland and shrub/brush rangeland. These habitats and cover types are shown in Appendix A, Sheets 1 to 20.

The US Fish and Wildlife Service (FWS) noted that the area surrounding Cool Creek and Hiway Run near the interchange at US 31 and SR 431 provides a large block of wildlife habitat in relation to the large amount of development going on in the vicinity. Specifically the stream corridors are of good quality and appear to be good streams for aquatic habitat in the area.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP HAMILTON COUNTY, INDIANA



SOIL LEGEND *

- 1 Crosby-Brookston: Deep, nearly level, somewhat poorly drained and very poorly drained, medium textured and moderately fine textured soils that formed in a thin mantle of loess and the underlying glacial till on uplands
- 2 Miami-Crosby: Deep, nearly level to strongly sloping, well drained and somewhat poorly drained, medium textured soils that formed in a thin mantle of loess and the underlying glacial till on uplands
- 3 Ockley-Westland-Fox: Deep and moderately deep over sand and gravel, nearly level to strongly sloping, well drained and very poorly drained, medium textured and moderately fine textured soils that formed in outwash on terraces
- 4 Shoals-Genesee: Deep, nearly level, somewhat poorly drained and well drained, medium textured soils that formed in alluvium on flood plains

* Terms for texture refer to the surface layer of the major soils.

Compiled 1977



Project Area

Source: Soil Survey of Hamilton County, Indiana (NRCS)



FIGURE 4.9-1
General Soil Map
Hamilton County, Indiana
Draft Environmental Impact Statement
Hamilton County, Indiana

Forested, Riparian Corridors. There is one forested riparian corridor located within the project area, Cool Creek north and east of 156th Street (Appendix A, Sheet 7). Typical canopy species in this habitat type are red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), American sycamore (*Platanus occidentalis*), green ash (*Fraxinus pennsylvanica*) and eastern cottonwood (*Populus deltoids*). The shrub understory is represented by amur honeysuckle (*Lonicera maackii*), multiflora rose (*Rosa multiflora*), black raspberry (*rubus occidentalis*), and bristly greenbriar (*Smilax hispida*). Herbaceous species consist of Virginia wild rye (*Elymus virginicus*), nodding wild rye (*Elymus canadensis*), tall nettle (*Urtica procera*), and stinging nettle (*Urtica dioica* subsp. *Dioica*). Wildlife species typically observed in this habitat type include raccoon (*Procyon lotor*), whitetail deer (*Odocoileus virginianus*), woodchuck (*Marmota monax*), striped skunk (*Mephitis mephitis*), belted kingfisher (*Chloroceryle americana*), tufted titmice (*Parus bicolor*), Carolina chickadee (*Parus carolinensis*), wood thrush (*Hylocichla mustelina*), blue jay (*Cyanocitta cristata*), downy woodpecker (*Picoides pubescens*), red-tailed hawk (*Buteo jamaicensis*), great blue heron (*Ardea herodias*) and waterfowl species.

Shrub/Brush Rangeland. Herbaceous species typically found in Shrub/Brush Rangeland include grasses (*spp.*), clover (*spp.*), wild carrot (*Daucus carota*), and dandelion (*Taraxacum officinale*). The shrub layer consists of honeysuckle (*spp.*), multiflora rose (*Rosa multiflora*), black raspberry (*rubus occidentalis*). This habitat type provides limited cover, foraging and breeding opportunities for wildlife species such as the fox squirrel (*Sciurus niger*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), prairie vole (*Microtus ochrogaster*), eastern cottontail (*Sylvilagus floridanus*), Virginia opossum (*Didelphis virginiana*), and raccoon (*Procyon lotor*). Avian species such as house sparrow (*Passer domesticus*), song sparrow (*Melospiza melodia*), European starling (*Sturnus vulgaris*), and Carolina chickadee (*Parus carolinensis*) may utilize this area briefly as well.

Upland Forests. Wooded areas within the project area are widely scattered and consist of small isolated tracts of early, mid and late growth successional forests. Typical canopy species in these areas are white oak (*Quercus alba*), sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), and black cherry (*Prunus serotina*). The shrub understory consists of honeysuckle (*Spp.*), multiflora rose (*Rosa multiflora*), black raspberry (*rubus occidentalis*), and bristly greenbriar (*Smilax hispida*). Herbaceous species include purple trillium (*Trillium erectum*), black snakeroot (*Sanicula canadensis*), mayapple (*Podophyllum peltatum*), and rue anemone (*Anemonella quinquefolium*). Wildlife species typically observed in these areas are similar to wildlife present in forested, riparian corridors with the exception of waterfowl.

Agricultural/Pastureland. Vegetation on tilled or active cropland is limited to soybeans, corn and winter wheat for much of the growing season. Herbaceous species typically found in pastureland includes grasses (*spp.*), clover (*spp.*), wild carrot (*Daucus carota*), and dandelion (*Taraxacum officinale*). Due to the constant disturbance of the land by agricultural or grazing practices, there is limited cover, foraging and breeding opportunities for wildlife species such as the fox squirrel (*Sciurus niger*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), prairie vole (*Microtus ochrogaster*) and eastern cottontail (*Sylvilagus floridanus*). Avian species such as house sparrow (*Passer domesticus*), song sparrow (*Melospiza melodia*), European starling (*Sturnus vulgaris*), common grackle (*Quiscalus quiscula*) and Carolina chickadee (*Parus carolinensis*) may utilize this area briefly as well.

Herbaceous Rangeland. Herbacious vegetation typical of fallow fields includes clover (*spp.*), goldenrods (*Solidago spp.*), common ragweed (*Ambrosia artemisiifolia*), and grasses (*spp.*). Similar species to those utilizing agricultural or pastureland are found in fallow fields. Fallow fields provide more suitable habitat for cover, foraging and breeding.

Additional wildlife located throughout the project area includes neotropical songbirds which require large wooded tracts to raise their young. Neotropical songbirds include a large number of different species of birds that use a variety of different cover types: the blue-gray gnatcatcher (*Poliophtila caerulea*), American redstart (*Setophaga ruticilla*), willow flycatcher (*Empidonax traillii*), red-eyed vireo (*Vireo olivaceus*) and common yellowthroat (*Geothlypis trichas*). These birds utilize most undeveloped and some developed properties for foraging and cover and in some cases nesting.

4.9.3 Threatened and Endangered Species

Information about threatened and endangered species within the project area was provided by the United States Fish and Wildlife Services (USFWS) and IDNR (Appendix C). The USFWS stated that the project area is within the range of the federally endangered Indiana bat and federally threatened bald eagle. There are no current records of Indiana bats near the project corridor; however, the streams in the affected area had not been surveyed for the species prior to this project. The USFWS indicated that there is suitable summer habitat for Indiana bats in forested areas along Cool Creek and possibly in the other riparian forest areas within the project area. Locally, there are multiple records of this species in adjacent Marion County, including a location within ten miles of the project area. At the request of the USFWS, an Indiana bat survey was conducted in May and June 2002 in the riparian corridor of Cool Creek near the southern portion of the project area. No Indiana bats were collected or observed during the survey. It was also reported that there are no bald eagle nests or significant habitat areas near the project corridor.

According to the IDNR, NHP database (January 31, 2002), the red-shouldered hawk, a state species of special concern, and the American badger, a state endangered species, have been reported to occur in the project vicinity, though these reports are 13 to 45 years old. No critical habitat for any threatened or endangered species, including the Indiana bat, has been identified within the project area.

Table 4.9-1 identifies the probability of state and federally listed species and their habitat requirements. This listing includes only species within the proposed project area.

Table 4.9-1
State and Federally Listed Species with Ranges Including the Project Area

SPECIES	COMMON NAME	STATE ¹ STATUS	FEDERAL ² STATUS	STATE ³ RANK	GLOBAL ⁴ RANK	PREFERRED HABITAT ⁵	PROBABILITY OF OCCURRENCE WITHIN PROJECT AREA ⁶
Mussels							
<i>Toxolasma parvum</i>	Lilliput	-	-	S2	G5	Ponds, lakes and creeks to large rivers in mud, sand, or fine gravel. Host Fish is unknown.	Low – semi-suitable habitat observed in deep marsh
Amphibians							
<i>Necturus maculosus</i>	Mudpuppy	SSC	-	S2	G3	Under rocks, debris, bank overhangs of permanent lakes, ponds impoundments, streams and rivers of all types. Needs unpolluted waters for reproduction.	Low - semi-suitable habitat observed on-site
Reptiles							
<i>Clemmys guttata</i>	Spotted turtle	E	-	S2	G5	Unpolluted, small, shallow bodies of water such as marshes, wet prairies, bogs, fens, woodland streams, swamps and vernal pools. Often basks on waters edge on logs or vegetation clumps.	Low - semi-suitable habitat observed on-site
<i>Sistrurus catenatus catenatus</i>	Eastern massasauga	E	-	S2	G3, G4, T3, T4	Sphagnum bogs, fens, swamps, marshes, shrub-dominated peatlands, wet meadows, floodplains, dry woodland, seasonal wetlands with mixture of open grass-sedge areas and short closed canopy.	Low - semi-suitable habitat observed on-site
Birds							
<i>Bartramia longicauda</i>	Upland sandpiper	E	-	S3B	G5	Extensive, open tracts of short grassland, native prairie, dry meadows, pastures, domestic hayfields, short-grass savanna, plowed fields, highway rights-of-way, and airfields. Nests on ground within grassy areas.	Low - semi-suitable habitat observed on-site
<i>Buteo Lineatus</i>	Red-shouldered hawk	SSC	-	S3B	G5	Bottomland hardwoods and riparian areas, upland deciduous or mixed deciduous-conifer forests. Nests in large, living trees near swamps, marshes, rivers, or other bodies of water.	Moderate - suitable habitat observed on-site
<i>Haliaeetus leucocephalus</i>	Bald eagle	T	T	-	-	Mature forests near large bodies of water.	Very Low - suitable habitat not observed on-site
<i>Ixobrychus exilis</i>	Least bittern	E	-	S3B	G5	Tall emergent vegetation in marshes with scattered bushes or other woody growth. Readily uses constructed wetlands. Nests in cattails and similar vegetation within shallow marshes.	Very Low - suitable habitat not observed on-site
<i>Nycticorax nycticorax</i>	Black-crowned night-heron	E	-	S1B, SAN	G5	Marshes, swamps, wooded streams, ponds. Nests in shallow marsh vegetation, clumps of grass on dry ground and areas associated with other species of herons.	Low - semi-suitable habitat observed on-site
<i>Thryomanes bewickii</i>	Bewick's wren	E	-	S1B, SZN	G5	Brushy areas, thickets and scrub in open and riparian woodlands. Nests in natural tree cavities. Occasionally in fence posts, birdhouses or buildings.	Moderate - suitable habitat observed on-site

Table 4.9-1 Continued.

SPECIES	COMMON NAME	STATE ¹ STATUS	FEDERAL ² STATUS	STATE ³ RANK	GLOBAL ⁴ RANK	PREFERRED HABITAT	PROBABILITY OF OCCURRENCE WITHIN PROJECT AREA
Mammals							
<i>Lynx rufus</i>	Bobcat	E	-	S1	G5	Large tracts of various habitats, deciduous-coniferous woodlands, forest edge, hardwood forests, swamps, forested river bottomlands, brushlands	Low - suitable habitat observed on-site, but regional habitat marginal
<i>Myotis sodalis</i>	Indiana bat	E	E	-	-	Hibernaria is in caves and mines; maternity and foraging habitat is located near small stream corridors with well-developed riparian woods; and upland forests.	Moderate - suitable habitat observed on-site
<i>Taxidea taxus</i>	American badger	E	-	S2	G5	Fallow fields, old gravel pits, stream corridors, railroad right-of-way	Moderate - suitable habitat observed on-site
<i>Lynx rufus</i>	Bobcat	E	-	S1	G5	Large tracts of various habitats, deciduous-coniferous woodlands, forest edge, hardwood forests, swamps, forested river bottomlands, brushlands	Low - suitable habitat observed on-site, but regional habitat marginal
Plants							
<i>Armoracia aquatica</i>	Lake cress	E	-	S1	G4	Areas surrounding rivers such as oxbows and forested floodplains, pools along rivers, quiet shallow water along lake margins or in the backwaters of slow-moving streams, muddy rocky shores of large ponds and lakes. Blooming period - early spring.	Moderate - suitable habitat observed on-site
<i>Drosera intermedia</i>	Spoon-leaf sundew	R	-	S2	G5	Wet places, shallow water, fens and open bogs.	Moderate - suitable habitat observed on-site
<i>Platanthera leucophaea</i>	Prairie white-fringed orchid	E	T	S1	G2	Mesic to wet prairies and wet sedge meadows, sedge-sphagnum bog mats around neutral pH kettle lakes, fallow agricultural fields, wet ditches and railroad rights-of-way.	Very Low - suitable habitat not observed on-site

1. State Status - X = extirpated, E = endangered, T = threatened, R = rare, SSC = special concern, WL = watch list, SG = significant, ** = no status but rarity warrants concern. Indiana Department of Natural Resources, Division of Nature Preserves Web Site - <http://www.ai.org/dnr/naturepr/species/index.htm> (November, 2002).

2. Federal Status - E = endangered, T = Threatened, LE = different listings for specific ranges of species, PE = proposed endangered, PT = proposed threatened, e/sa = appearance similar to a listed endangered species, - = not listed

3. State Rank - SX = presumed extirpated, SH = possibly extirpated, S1 = critically imperiled, S2 = imperiled, vulnerable, S4 = apparently secure, S5 = secure, SR = reported, SZ = migratory transient, SE = exotic, S? = unranked, SU = unrankable

4. Global Rank - GX = presumed extirpated, GH = possibly extirpated, G1 = critically imperiled, G2 = imperiled, vulnerable, G4 = apparently secure, G5 = secure, GR = reported, GZ = migratory transient, GE = exotic, G? = unranked, GU = unrankable

4.10 Water Resource

4.10.1 Surface Water

Surface water features in the project area are primarily flowing water bodies including creeks and their tributaries, all of which are collectively contained in the Upper White River watershed. These water bodies include Lindley and Jones Ditches; Grassy Branch, Cool, Carmel and Little Cool creeks; Hiway Run; and, two unnamed tributaries to Cool Creek and one to Williams Creek

(Appendix A, Sheets 1 to 20). Many of the streams within the project area are considered legal drains by the Hamilton County Surveyors Office, and therefore, are regulated by the Hamilton County Drainage Board.

There are no natural lakes in the project area; however, many residential developments and commercial/office complexes have man-made retention ponds for recreational, aesthetic, and water storage purposes.

As indicated by the IDNR, Division of Water, use of surface water has continued to increase from 1986 through 1997, especially for energy production, industry, agriculture and public water supply. Little data is available on the water quality. Volunteer monitors have recorded partial results for only one site near Carmel High School in Cool Creek. Through the USGS National Water Quality Assessment (NAWQA), some regional information is available on surface water quality in the local watershed, though none on the specific water bodies mentioned herein. Overall, findings indicated elevated concentrations of pesticide contaminants were of key concern and that concentrations and types depend heavily on land use in the surrounding area.

Surface water can support many species of benthic macroinvertebrates such as *diptera*, *coleoptera*, *ephemeroptera*, *odonata* and *trichoptera*. These macroinvertebrates serve as excellent environmental indicators of stream quality, some being very pollution sensitive and others very pollution tolerant.

Additionally, the US Army COE noted in a letter dated July 27, 2001 that wetlands and/or riffle and pool complexes within stream channels are classified as special aquatic sites as per Federal Register 40 CFR 230.10. Any project outlined under Section 404 of the Clean Water Act (CWA) must comply with the Section 404 (b) (1) guidelines outlined in 40 CFR 230.10 before a Department of the Army permit is issued.

4.10.2 Groundwater

Groundwater in the area is delivered from the White River Basin aquifer system. According to the IDNR, annual groundwater withdrawal between 1986 and 1997 has continued to rise for usage in energy production, agriculture, and public supply. Quality of this water in the watershed, though not necessarily in the project area, has been monitored by the USGS through 94 monitoring wells. Much like surface water, pesticides were of concern, though none exceeded any federal guidelines. Volatile organic compounds (VOCs) were also of concern as they were detected in over half of the shallow urban monitoring wells. These compounds, however, did not exceed federal drinking water standards. Nitrates were also detected in both shallow and deep wells, with concentrations in shallow wells exceeding federal drinking water standards.

Because of the potential for contamination, both the City of Carmel and the Town of Westfield have enacted wellhead protection programs for their municipal water supplies. These programs require buffers around each of the production wells as well as regulate potential contaminant releases in order to protect groundwater quality. The City of Carmel's 20 production wells are scattered between Rangeline Road and Hazel Dell Parkway, none of which are within the project area. The Town of Westfield has 5 wells; one is located north of the wastewater treatment plant south of SR 32, three are located immediately east of the existing US 31 alignment near Westfield Elementary School (Appendix A, Sheet 9), and one is located immediately west of the existing US 31 alignment (Appendix A, Sheet 7). A 200-foot radius, well-head protection zone has been established for each of these sites.

In addition to public wells, there are private wells located throughout the project area associated with homes and businesses. Most of these wells are located in rural areas that do not have access to a public water supply.

4.10.3 Special Status Streams

According to the IDNR listing of Indiana special streams, there are no Special Status Streams and/or Wild and Scenic Rivers in the project area.

4.11 Floodplains/Floodways

Floodplains, lowland areas adjacent to streams and rivers that are inundated by excess water breaching the stream/river banks during a flood, can be found in the project area in conjunction with several local water bodies (Appendix A, Figure A-3). Of particular interest are the 100-year floodplains as they indicate the most severe and infrequent flood-related water levels and they, as well as their associated floodway (i.e., the canal or path of the floodwater), are regulated via state statutes and laws as to construction within their boundaries. One-hundred-year floodplains can be found along Williams, Cool and Little Cool creeks; two unnamed tributaries of Cool Creek; Jones and Lindley ditches; and, Grassy Branch. Floodways can be found on Cool Creek, Little Cook Creek and Grassy Branch.

4.12 Wetlands

Wetlands are a category of “waters of the U.S.” for which a specific identification methodology has been developed. As described in detail in the *Corps of Engineers Wetland Delineation Manual* (1987), wetland boundaries are delineated using three criteria: hydrophytic vegetation, hydric soils, and wetland hydrology.

Wetland ecosystems in the project area were initially identified utilizing National Wetland Inventory (NWI) maps from the US Fish and Wildlife Service (USFWS). Field surveys of the corridor were then conducted to determine exact location and presence of wetlands within the project area. Five different types of wetlands were identified: forested, scrub-shrub, emergent, emergent/forested, and emergent/scrub-shrub.

Wetlands serve various functions including, but not limited to, removing pollutants, allowing slowed surface flow to recharge subsurface aquifers, buffering for thermal impacts, providing habitat for wildlife (particularly waterfowl), and providing flood storage. The relative value of wetlands is not easily quantified, however; complete loss of the functions obviously results in a cumulative net loss of value.

Wetland habitats vary depending upon location, depth to water table, length of inundation, size and quality. As such, wildlife and plant species utilizing these areas vary. The three primary wetland types related to the project area are described below:

Forested Wetland. There are 27 forested wetlands located within the project area. The largest forested wetland is approximately 9.661 acres and is located in the floodplain of Cool Creek just north of 156th Street and east of US 31 (Appendix A, Sheets 7 and 14). Typically, forested wetlands within the project area are less than 5 acres in size and rely on groundwater and precipitation runoff.

Plant species observed within this land use included such tree species as silver maple (*Acer saccharum*), eastern cottonwood (*Populus deltoids*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*) and box-elder (*Acer negundo*). Shrub species observed included gray dogwood (*Cornus racemosa*), amur honeysuckle (*Lonicera maackii*), stiff dogwood (*Cornus foemina*), northern spicebush (*Lindera benzoin*), and Morrow's honeysuckle (*Lonicera morrowii*). Vine species included poison ivy (*Toxicodendron radicans*) and Virginia creeper (*Parthenocissus quinquefolia*). Herbaceous species that were noted in this wetland type included reed canary grass (*Phalaris arundinacea*), Virginia wild-rye (*Elymus virginicus*), and rice cutgrass (*Leersia oryzoides*), Asa Gray's sedge (*Carex grayi*), blunt broom sedge (*Carex tribuloides*), fowl manna grass (*Glyceria striata*), rough avens (*Geum laciniatum*), common pokeweed (*Phytolacca americana*), black snakeroot (FAC+) and golden alexanders (*Zizia aurea*). These sites also contained varieties of sedge (*Carex spp.*), violet (*Viola spp.*), polygonum (*Polygonum spp.*), and impatiens (*Impatiens spp.*).

Scrub-Shrub Wetland. There are 10 scrub-shrub wetlands located within the project area. The largest scrub-shrub wetland within the project area is 1.6 acres and is located east of the intersection of US 32 and Grassy branch Road south of US 32 (Appendix A, Sheet 16). All of the remaining scrub-shrub wetlands within the project area are less than one acre in size and rely on groundwater and precipitation runoff.

Plant species observed within this land use included woody vegetation such as box-elder (*Acer negundo*), sandbar willow (*Salix exigua*), eastern cottonwood (*Populus deltoids*), northern spicebush (*Lindera benzoin*) and gray dogwood (*Cornus racemosa*). The herbaceous stratum consisted of common pokeweed (*Phytolacca americana*), polygonum (*Polygonum spp.*), and sedge (*Carex spp.*), clasping-leaf dogbane (*Apocynum cannabinum*), Kentucky fescue (*Festuca arundinacea*) and tall golden-rod (*Solidago altissima*), spotted jewelweed (*Impatiens capensis*), fowl manna grass (*Glyceria spp.*), and rice cutgrass (*Leersia oryzoides*).

Emergent Wetland. There are 12 emergent wetlands located within the project area. The largest emergent wetland located within the project area is 1.34 acres and is located north of 202nd Street and east of US 31 (Appendix A, Sheets 12 and 19). All of the remaining emergent wetlands within the project area are less than one acre in size and rely on groundwater and precipitation runoff.

Species observed within this land use included spike flatsedge (*Cyperus polystachyos*), rice cutgrass (*Leersia oryzoides*), fall panic grass (*Panicum dichotomiflorum*), barnyard grass (*Echinochloa crusgalli*), prairie dogbane (*Apocynum sibiricum*), slender rush (*Juncus tenuis*), Canada golden-rod (*Solidago canadensis*), curly dock (*Rumex crispus*), small-spike false-nettle (*Boehmeria cylindrical*), reed canary grass (*Phalaris arundinacea*), polygonum (*Polygonum spp.*) and great ragweed (*Ambrosia trifida*). These sites also contained varieties of sedge (*Carex spp.*) and impatiens (*Impatiens spp.*).

In addition, there is one forested/emergent, one forested/scrub-shrub and one scrub-shrub/emergent located within the project area. These wetlands exhibit characteristics representative of more than one of the wetland types referenced above.

Generally, wetlands identified in the project area are fragmented and primarily less than ten acres. The majority of the wetlands are located north of 136th Street (Appendix A, Sheets 6 to 20). The wetlands located south of 136th Street are typically less than one acre and are located in close proximity to major roadways, degrading the habitat quality of the wetland (Appendix A, Sheets 1 to 5). Most wetland systems within the project area are categorized as palustrine, and thus not associated with a river or lake system, but rather dependent on groundwater or precipitation runoff to sustain their hydrologic regime. Several small riverine wetlands occur along waterways within the project area.

4.13 Visual and Aesthetic Resources

Visual and aesthetic resources can be identified by examining the visual corridor of US 31. The visual corridor takes into account the entire landscape and for purposes of the US 31 corridor includes two main aspects: views to the road and views from the road. Views to the road include what is seen from an adjacent property when facing the roadway. These views are normally from a fixed vantage point where the visual corridor is viewed on a repetitive basis by drivers or pedestrians. Views from the road are experienced by roadway travelers, such as commuters, haulers or tourists. As roadway travelers, these viewers have a broader exposure to the visual corridor.

The US 31 project corridor has been broken into two segments for evaluation. The first or southern segment includes the portion of US 31 which transverses the City of Carmel and Clay Township between the intersection of I-465 / 96th Street and 146th Street. The majority of this area includes commercial and retail businesses. The second or northern segment includes the portion of US 31 which transverses the Town of Westfield and Washington Township between 146th Street and the US 31 / SR 38 intersection. This segment of the corridor is predominantly retail and agricultural. The inventory of the affected environment or the visual corridor focused upon the following elements: roadway, land use, building, landscape and views.

Southern Segment (I-465 / 96th Street to 146th Street)

The southern segment of the corridor is a 4-lane divided roadway (six lanes between I-465 and 106th Street). There are eight at-grade signalized intersections located along the southern US 31 corridor: 96th Street, I-465 eastbound and westbound ramps, 103rd Street, 116th Street, 126th Street / Carmel Drive, 136th Street, and Rangeline Road. SR 431 merges with US 31 south of 146th Street.

The visual corridor of the southern segment consists of many different land uses. The principal land use within the viewshed is commercial and retail businesses. The majority of these businesses are centrally located at or near major intersections in close proximity to US 31 (Figure 4.12-1). Residential properties are predominantly set back from the roadside, but in many cases, are within the visual corridor. Other visual elements within the corridor consist of small wooded lots, agricultural land and manicured lawns with gently rolling to level topography.



Figure 4.12-1 US 31/103rd Street Intersection
(looking southwest)

The architecture throughout this portion is diverse, from Contemporary to Georgian style architecture. The corporate office buildings along the south portion are multi-storied contemporary structures that utilize brick, granite, colored concrete, stone, steel or glass within the building facades. The St. Vincent Carmel Hospital near 136th Street is typical of a 1990's era modern, professional office building. Most buildings face the corridor, implementing aesthetics and landscaping within the viewshed. Storm water retention ponds within the corporate properties are naturally shaped and landscaped, with additional ponds incorporating elements such as fountains and accent lighting. Many of the parking lot layouts reflect the form of the building. The retail district north of 126th Street is typical of a 1990's era strip mall.



Figure 4.12-2 US 31/131st Street Intersection (looking southwest)

South of 126th Street, views from the road are primarily unobstructed to office/business properties and undeveloped parcels. Views to the road from the offices and retail businesses are unobstructed to the roadway. However, north of 126th Street the views from the road are limited due to the roadway's curved alignment, the rolling topography, and existing vegetation (Figure 4.12-2). North of 131st Street within the retail developments, views from the road are of retail stores and surface parking lots (Figure 4.12-3). Direct views to the road from the retail buildings are obstructed by the parking lots and other outbuildings.



Figure 4.12-3 US31/136th Street Intersection (looking north)

Northern Segment (146th Street to SR 38)

The northern segment of US 31 is a primarily rural section 4-lane divided roadway with seven at-grade signalized intersections at Greyhound Pass, 151st Street, 161st Street, SR 32, 181st Street, 191st Street and SR 38. This portion is a mixture of agricultural land, small isolated woodlands, retail and residential land uses. The 146th Street crossing is the corridor's largest retail center (Figure 4.12-4). North of this retail center, between 151st Street and 169th Street, properties consist of undeveloped and agricultural land. Most of the land use between 169th Street and 191st Street is retail. Retail activity along this portion is typical of suburban, auto-related businesses. North of 191st Street, properties are mostly undeveloped or agricultural land with scattered light industrial developments.



Figure 4.12-4 Retail center located between 146th Street and 151st Street (looking north)

South of 186th Street, building architecture includes one to three story structures. Older buildings in this segment are from the 1970's era (Figure 4.12-5). New developments such as the school east of the corridor at 181st Street and the retail developments at 146th Street are of the late 1990's era design. North of 186th Street, few buildings are located within the visual corridor, and the architecture is predominantly rural and light industrial. The topography is flat to gently rolling, and residential properties are set back from the roadside within wooded areas. The commercial properties adjacent the corridor are accented with landscaping within the viewshed and are typically set back with parking lots or drive lanes on the roadway-side of the building. Storm water retention ponds are absent from the view of the roadway within this segment.



Figure 4.12-5 SR 32/US 31 Intersection (looking northwest)

North of 186th Street, the land is a mixture of agricultural land and woodlands. Views from the road are unobstructed to the developed properties including the retail developments and the light industrial properties. Residential developments adjacent to the corridor are not visible from the road given the topography and existing vegetation. Within the northern segment of US 31, views to the road from the retail and light industrial properties are partially obstructed by landscaping and associated development. Views to the road from the residential properties are obstructed by vegetation and topography.

Alternatives G1 through G6 Corridor

The build alternatives share the same alignment from 96th Street to 156th Street. North of 156th Street, Alternatives G1 through G6 diverge from the existing US 31 corridor and follow a new eastern alignment. Alternatives G1 through G6 transverse existing residential and agricultural land use (Figure 4.12-6).



Figure 4.12-6 SR 32 – Alternatives G1 through G6 Corridor (looking southeast)



Figure 4.12-7 191st Street – Alternatives G1 through G6 Corridor (looking northwest)

Buildings along this corridor are primarily residential single-family homes. The gently rolling landscape in the northern segment consists mainly of agricultural land, residential properties, and small isolated tracts of woodlands (Figure 4.12-7). The rural roadway grid is the predominant feature on the land. Given the topography and the agricultural land use, the majority of the views to and from the alignment are largely unobstructed.

4.14 Hazardous Material Sites

A database search was conducted along the project corridor to identify areas of potential environmental impairment. The search was conducted in accordance with the American Society for Testing and Materials (ASTM) E 1527-00, *Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment (ESA) Process*, to identify recognized environmental conditions at or near the project location. “The term **recognized environmental conditions** means the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.” Additional historic records reviewed included aerial photography and topographic quadrangles.

In accordance with ASTM E 1527-00 the following databases were included in the government records review: National Priorities List (NPL) sites; Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) sites; Emergency Response Notification System (ERNS) sites; registered underground storage tanks (USTs); reported leaking underground storage tanks (LUSTs); Resources Conservation and Recovery Sites (RCRA) which include corrective action sites, hazardous waste handlers and hazardous waste generators; state listed sites such as landfills and spills.

The following recognized environmental conditions were identified within close proximity to project area: 15 RCRA small quantity generators (SQGs) of hazardous waste, 24 UST facilities, 10 reported LUST incidents and 2 reported spills. Table 4.14-1 provides a listing of all sites of environmental concern located throughout the corridor. These sites are also identified by number in Appendix A, Sheets 1 to 20.

**Table 4.14-1
Sites of Potential Concern**

Appendix A Map ID	Facility Type & ID #	Location (Address or referenced)	Concerns
1	SQG – 1000841370 LUST – 1000751632 UST - none	9601 North Meridian Street	Abandoned gas station, Shell Oil Co., building razed. Located monitoring wells and abandoned well. One of the wells appears to have been installed recently. Two 55-gallon drums, one contains purge water and one contains soil cuttings from MW-16. Labels on drums appear to be fairly new. Surface is mostly gravel. Listed as SQG, LUST site and UST site.
2	LUST – U001077316 UST – none	9602 North Meridian Street	Abandoned gas station, SS #10044, building razed. Located monitoring wells and well clusters, soil borings, abandoned wells and possibly abandoned recovery wells. Noted PVC and galvanized pipe and two 55-gallon drums probably containing purge water. Drums labeled “4-29-97.” Appears UST system was removed. Listed as LUST and UST site.

Table 4.14-1 Continued

Appendix A Map ID	Facility Type & ID #	Location (Address or referenced)	Concerns
3	LUST – U001078539 UST – none SQG – 1000907848	9599 North Meridian Street	Shell Service Station, LUST and UST site.
4	LUST – not reported UST – none	10101 North Meridian Street	Tutweiler Cadillac Peugeot Inc., car dealership and repair shop, SQG, LUST site and UST site.
5	SQG – 1000907848	101 West 103 rd Street	Thomson Consumer Electronics, listed as SQG.
6	UST – U001322124	55 East 111 th Street	Delta Faucet Company, listed as registered UST facility.
7	UST – U003188776	11075 North Pennsylvania Street	Charter Arbor Indy Behavioral, listed as registered UST facility.
8	SQG – 1000979227	11455 North Meridian Street	AT & T Corp., listed as SQG.
9	UST – U003210507	11595 North Meridian Street	One Penn Mark Plaza, listed as registered UST facility.
10	UST – U000186307 UST – none	11611 North Meridian Street	Meridian Mark I, listed as registered UST facility.
11	LUST – 1000761921 Spill – S103004744	11711 North Meridian Street	Meridian Mark II, listed as LUST, UST and Indiana spill site.
12	SQG - 1000513667	12520 US 31 North	Star Cleaners, dry cleaning facility, SQG.
13	UST – U002245036	12999 North Pennsylvania Street	Manor Care Health System #541, registered UST facility.
14	UST – 1000509415	13500 North Meridian Street	St. Vincent Carmel Hospital 22, listed as registered UST facility.
15	SQG – not reported	Circle Drive/US31 Intersection	J & F furniture stripping and refinishing located on northwest corner. Cinder block building setback ~50' from US31.
16	SQG – 1000321406	1040 North Rangeline Road	Point Cleaners, dry cleaning facility, SQG.
17	UST – U001082643	1032 North Rangeline Road	Speedway Unit #5468, 1-story wood/steel building with pump islands and USTs. Setback ~25' from US31, registered UST facility. Additionally, this facility is a former Phillips 66 Station.
18	SQG – IND984914580	1950 East Greyhound Pass	Nu-Way Cleaners, Inc., dry cleaning facility, SQG.
19	SQG – not reported	NE of Greyhound Pass/US 31 Intersection	Jiffy Lube oil change facility. Storage and use of new oil and disposal of used oil.
20	SQG – not reported	14950 Greyhound Court	Deering Cleaners, dry cleaning facility, SQG.
21	UST – not reported	Intersection 151 st Street/US 31	Shell Service Station located on southeast corner, 1-story steel building, pump islands and USTs.
22	SQG – 1000510369 UST – not reported	1850 East 151 st Street and US 31	BP gas station (formerly Amoco Oil Co 2287) with carwash, pump-islands and USTs.

Table 4.14-1 Continued

Appendix A Map ID	Facility Type & ID #	Location (Address or referenced)	Concerns
23	SQG – not reported	1840 East 151 st Street and US 31	Indy Lube oil change facility. Storage and use of new oil and disposal of used oil.
24	LUST – U000184141 UST – not reported	169 th Street/US31 Intersection (525 David Brown Drive)	Tom Roush Mazda/Lincoln/Mercury new and used car sales and service center with quick lube. Located on southeast corner, UST and LUST. Setback >50' from US31.
25	UST – 1000508200	NW corner of US 31/169 th Street Intersection	Sakrete of Indiana, Inc., bagging facility, UST.
26	LUST – 1000508450 UST – not reported IN spills – not listed	17303 US 31 North	Carmel Chemical Corporation (Carmel Custom Refinishing), furniture refinishing, LUST and Indiana Spill site.
27	LUST – U001959092 UST – not reported	17300 US 31 North	Truss Manufacturing Co., LUST and UST site.
28	LUST – U001078677 UST – not reported	SR32/US31 Intersection	Marathon gas station located on southeast corner, pump islands, USTs and monitoring wells.
29	LUST – U003094076 UST – not reported	SR32/US31 Intersection	Gas America gas station located on northeast corner pump islands and USTs. (orphan site)
30	Potential UST facility	SR32/US31 Intersection	Taco Bell on northwest corner of intersection is former gas station. Probability of USTs on site.
31	Potential UST facility	North Side SR 32 West of US 31	Abandoned gas station and restaurant, former tank fields observed on east side of building. USTs may be present on the property.
32	UST facility	SR32/US31 Intersection (201 West Main Street)	Gas station located on southwest corner of intersection attached to McDonalds. Pump islands and USTs in use at facility.
33	SQG – 1000513516	181 st Street/US 31 Intersection	Hall & House Lumber located on southwest corner, lumber yard, SQG. (orphan site)
34	SQG – 1001077188	645 Union Street	Westfield High School, listed as SQG.
35	SQG – 1000463614	18881 North US 31	Indiana Mills & Manufacturing Inc., listed as SQG.
36	UST facility	216 th Street/US 31 Intersection	Gas Station located on southeast corner of intersection, UST facility.